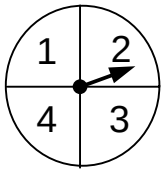
Modeling with Other Random Devices

1. A goalie saves half of the attempted shots on goal. Suppose there were twelve attempted shots in a game.

   a. Describe how you could use a coin to simulate the attempted shots in one game.

   b. Describe how you could use a six-sided number cube to simulate the attempted shots in one game.

   c. Describe how you could use this spinner to simulate the attempted shots in a game.



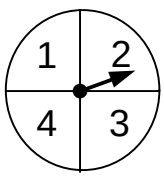
   d. Describe how you could use a standard deck of 52 cards to simulate the attempted shots in one game.

2. A basketball player makes 75% of her free-throw attempts. Suppose she attempts 20 free-throws in a game.

   a. Could you use a coin to simulate the attempted free-throws in a game? Use mathematics to justify your answer.

   b. Could you use a six-sided number cube to simulate the attempted shots in one game? Use mathematics to justify your answer.

   c. Could you use this spinner to simulate the attempted shots in a game? Use mathematics to justify your answer.



d. Could you use a standard deck of 52 cards to simulate the attempted shots in one game? Use mathematics to justify your answer.

Modeling with Other Random Devices
Answer Key

1. a. Answers will vary. Let heads represent saving a shot on goal and tails represent missing one. Flip the coin twelve times to observe the outcome of each attempt.
   b. Answers will vary. Let odd numbers represent saving a shot on goal and even numbers represent missing one. Toss the number cube twelve times to observe the outcome of each attempt.
   c. Answers will vary. Let odd numbers represent saving a shot on goal and even numbers represent missing one. Toss the number cube twelve times to observe the outcome of each attempt.
   d. Answers will vary. Let red cards represent saving a shot on goal and black cards represent missing one. Draw twelve cards from the deck (one card at a time, with replacement) to observe the outcome of each attempt.
2. a. No. A coin has two equally-likely outcomes. The outcomes, in this case hit or miss, are *not* equally-likely.
   b. Yes. Let ¾ of the numbers (for example 1, 2, 3, and 4) represent making a free-throw, and let the other numbers (for example 5 and 6) represent missing one. Toss the cube twenty times and observe results.
   c. Yes. Let ¾ of the numbers (for example 1, 2, and 3) represent making a free-throw, and let the other numbers (for example 4) represent missing one. Spin the spinner twenty times and observe the results.
   d. Yes. Let ¾ of the sits (for example hearts, spades, and diamonds) represent making a free-throw, and let the other suit (for example clubs) represent missing one. Draw twenty cards from the deck (one card at a time, with replacement) to observe the outcome of each attempt.